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**Effects of atomic radiation**

# Effects of atomic radiation

## Note by the Secretary-General

1. In its resolution 52/55 of 10 December 1997, the General Assembly invited the International Atomic Energy Agency and the World Health Organization to consider the functions and role of the United Nations Scientific Committee on the Effects of Atomic Radiation and to submit a recommendation to the Assembly at its fifty-third session.

2. The Secretary-General has the honour to transmit to the General Assembly the attached report, which was prepared by the World Health Organization.

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# Annex

## Report prepared by the World Health Organization

## I. Functions and role of the United Nations Scientific Committee on the Effects of Atomic Radiation

1. The major aims of the Committee's work are to assess the consequences to human health of a wide range of doses of ionizing radiation and to estimate the dose to people all over the world from natural and man-made radiation sources.

2. Since the Committee began its work in 1955, 13 reports summarizing all available scientific information on radiation sources and effects of ionizing radiation have been prepared and presented to the General Assembly, and thereby to the scientific and world community. The latest findings and evaluations of the Committee have been issued in a series of publications: the Committee's 1993 report, with nine scientific annexes, the Committee's 1994 report, with two scientific annexes and the Committee's 1996 report, with one scientific annex. These three publications form a series of reports entitled "Sources and effects of ionizing radiation".

3. Information collected and interpreted in the Committee reports is very useful for United Nations Member States and international organizations in their activities related to planning and implementation of radiation protection programmes. For example, the Committee report for 1993 provides the results of an evaluation by the Committee of the biological effects of ionizing radiation, levels of exposure from natural sources, nuclear power production, major accidents, nuclear explosions and from the production of nuclear weapons. In addition, it considers levels from medical and occupational exposures and the perception of radiation risks. Epidemiological studies of cancer risks associated with both external and internal exposure to ionizing radiation were the subject of an extensive review in the Committee's 1994 report. The Committee's 1996 report evaluates the effects of ionizing radiation on plants and animals in the environment.

4. The Committee also evaluates current concepts regarding the mechanisms of radiation cancerogenesis, influence of radiation dose and dose rate on stochastic effects, hereditary effects of radiation, medical consequences of exposure to radiation of the developing human brain and late deterministic effects in children. The assessment of cancer risks is based on analysis of epidemiological studies of cancer mortality and incidence among the survivors of the atomic bombings of Hiroshima and Nagasaki, patients exposed to radiation for diagnosis and therapeutic purposes, and radiation workers and individuals exposed to environmental radiation. During the last few years, the Committee has paid more attention to the study of cancer risks in various groups with exposure to plutonium in some nuclear facilities and radon in mines and homes. In addition, more emphasis is being put on such aspects as how to transfer radiation-induced risks from one population to another, the potential for bias or confounding, the impact of errors in dosimetry, and other sources of uncertainty in radiation epidemiology studies.

5. The Committee continues its efforts to further evaluate the sources and effects of ionizing radiation. A series of Committee documents issued in 1997 shows that the Committee focuses on the evaluation of new scientific results regarding the radiation effects at cellular and molecular levels and new information from radiobiological and epidemiological studies. They concern, in particular, DNA repair and mutagenesis, estimation of genetic risks, combined effects of radiation and other agents, dose assessment methodology, and epidemiological evaluation of radiation-induced cancer. It is expected that in two years the Committee will publish a comprehensive report which will improve the understanding of the effects of radiation and the underlying risks.

6. Analysis of the Committee's activities carried out during the 43 years of its work shows that the Committee, from the WHO point of view, has been following its functions which were outlined in United Nations General Assembly resolution 913 (X) of 3 December 1955. Committee reports have provided valuable contributions to understanding the mechanisms of the health effects of ionizing radiation, developing basic safety standards, and improving the use of ionizing radiation in medicine and promoting radiation protection programmes at national and international levels. The Committee keeps its leading role in the world as the only international committee providing comprehensive evaluation of the effects of ionizing radiation.

## II. Administrative arrangements for the Committee's secretariat

7. The Committee's secretariat has been located in Vienna since 1974 when the United Nations General Assembly accepted an offer of accommodation from the Government of Austria. The secretariat consists of the Director and two General Service staff members. The United Nations Office at Vienna (since 1979) provides administrative support services for the Committee and its activities are supported financially through the United Nations programme budget approved by the General Assembly. The Committee reports and other technical documents are prepared by consultants and discussed at regular sessions of the Committee.

8. During the period from its establishment in 1955 to 1974, the Committee's secretariat was located at United Nations Headquarters in New York. Until 1976, the Office of the Under-Secretary-General for Special Political Affairs provided the Committee with administrative support. The transferring of the Committee's secretariat to Europe facilitated its cooperation with relevant international organizations such as the World Health Organization (WHO), the International Atomic Energy Agency (IAEA), the United Nations Environment Programme (UNEP) and the United Nations Industrial Development Organization (UNIDO).

## III. Relationship between the World Health Organization and the United Nations Scientific Committee on the Effects of Atomic Radiation

9. The activities of WHO and the Committee in the field of evaluation of the health effects of ionizing radiation are complementary and not competitive. Both organizations have always been paying due attention to the assessment of radiation effects on humans and their offspring, environmental radioactivity and its possible health implications. In this context, the Committee provides general assessment of worldwide information regarding sources, levels and effects of ionizing radiation. This assessment also includes relevant WHO reports and publications. WHO concentrates its attention on such matters as the assessment of the health impacts of the application of nuclear technology, comparison of these impacts with outputs of other technologies for achieving the same goal, evaluation of health implications of nuclear power, and prevention or mitigation of hazardous health effects of ionizing radiation. WHO activities in radiation protection are, however, not restricted to the evaluation of health effects. They deal with a broad spectrum of problems such as development of basic radiation protection standards, diagnosis of overexposure and treatment of radiation injuries, medical supervision of radiation workers, radiation protection of patients and personnel in hospitals, medical handling of radiation emergencies, etc. The primary aim of WHO in the field of radiation protection is to improve radiation protection services at national and international levels. The Committee assessments serve as a basis in this direction.

10. Cooperation between WHO and the Committee has a long history. For example, a representative of the Committee took part in the first meeting of the WHO Expert Committee on Radiation (Effects of Radiation on Human Heredity), which was held at Geneva from 28 July to 2 August 1958. As a rule, both organizations inform each other about relevant arrangements and invite each other to participate in meetings. Many Committee sessions were attended by WHO representatives and their contributions to the discussions were acknowledged by the Committee.

11. The Chernobyl accident gave a strong new impulse for further cooperation between WHO and the Committee. In the first years after the accident, WHO, jointly with other international organizations (the Food and Agriculture Organization of the United Nations, IAEA, the International Labour Organization, the Organisation for Economic Cooperation and Development/Nuclear Energy Agency, and the Pan American Health Organization), initiated the development of International Basic Safety Standards for protection against ionizing radiation and for the safety of radiation sources. It took almost 10 years to develop and publish these standards (IAEA, Vienna, 1996) which are based on the evaluations of sources and effects of ionizing radiation provided by the Committee. Both organizations participated in the International Chernobyl Project. WHO provided the Committee's secretariat with a scientific report on the results of the WHO International Programme on the Health Effects of the Chernobyl Accident in order to include the results obtained in the Committee's assessments of health consequences of the catastrophe. The Committee's secretariat cooperated with WHO, IAEA and the European Commission in the organization of the international conference "One Decade after Chernobyl – Summing up the Consequences of the Accident" (Vienna, 1996).

12. One of the latest cooperative activities of WHO and the Committee was the International Conference on "Low doses of ionizing radiation: biological effects and regulatory control", which was held in Seville, Spain in 1997. The

conference was jointly sponsored by WHO and IAEA. The keynote presentation on "Sources, exposures and biological effects of ionizing radiation" was provided by the Committee secretariat.

## IV. The Committee's reporting arrangements

13. The Committee has been operating as an independent scientific board within the framework of the United Nations system. It has been directly reporting to the General Assembly. However, as part of the reform process of the United Nations system, the General Assembly, in resolution 52/55 of 10 December 1997, requested the Committee to submit its next report to WHO and IAEA, as well as to the Assembly, which will consider the report together with the evaluation of the report by WHO and IAEA.

14. The possibility of merging the secretariats of the Committee and IAEA was considered by the General Assembly in 1991 (resolution 46/185 C). However, IAEA felt that the Committee should preserve full independence because the mandates of these two institutions were quite distinct. This position was supported by the Committee, which reported to the Assembly in June 1992 that alternative arrangements for its secretariat might well prejudice the perception of both its authority and its independence.

## V. Recommendations to the General Assembly

15. The World Health Organization recommends that the General Assembly maintain the present functions and independent scientific role of the Committee, including the present reporting arrangements.

16. It further recommends that, should the General Assembly decide otherwise, the Secretary-General consult with the World Health Organization prior to any such decision in order to consider other institutional arrangements such as a WHO/IAEA joint scientific committee.

## VI. Evaluation of the annual report submitted by the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly in 1998

17. The Committee's report provides the General Assembly with information on the Committee's progress of work. The report covers issues such as the function and role of the Committee, interactions with other United Nations agencies, the present and future programme, and ends with a summary and recommendations to the General Assembly.

18. The Committee's current and planned activities are consistent with its mandate, which has been reviewed since 1955 when the Committee was established.

19. The Committee is now the major international body which reviews the exposure of the world population to all radioactive sources under normal circumstances and after major radiological accidents. Comprehensive scientific reports are submitted to the General Assembly at intervals of several years and serve as a basis for the development of international radiation safety standards, promotion of scientific knowledge on the health effects of ionizing radiation, evaluation of radiation risks and planning of research.

20. The Committee has paid major attention to the primary late effects of exposure of a population to ionizing radiation. It has looked at the probability of the development of an excess of cancers many years after exposure. Scientific analysis of available data of epidemiological, experimental and molecular biology studies has shown significant increases in the risk estimates over time. This Committee's conclusion is based on the evaluation of cancer morbidity and mortality in cohorts exposed to ionizing radiation due to the atomic bombings at Hiroshima and Nagasaki and other groups of population irradiated for medical diagnostic or therapeutic reasons.

21. The Committee's estimates of radiation risks, levels of environmental radioactivity, and radiation health effects are widely used throughout the world. The Committee's comprehensive scientific reports on sources and effects of ionizing radiation have become one of the more significant and important guides for those who are working in the field of radiation protection, radiobiology, radiation medicine and epidemiology.

22. The Committee involves the work of many reputable scientists and specialists representing more than 20 States

Members of the United Nations. It should be emphasized that the Committee's scientific reports have been widely evaluated by the experts of many relevant national and international organizations, including WHO, before being submitted to the General Assembly. Those aspects of radiation biological or health effects, especially at the level of low doses of ionizing radiation, which have not yet been scientifically assessed, are clearly identified by the Committee as areas requiring further research.

23. The Committee has been fruitfully cooperating with WHO which has been regularly invited to meetings and has actively participated in the discussions and commentaries on the Committee's reports.

24. The approach used by the Committee has assisted in the development of many scientific projects for the evaluation of the health effects of the Chernobyl accident included, for example, in the International Programme on the Health Effects of the Chernobyl Accident (IPHECA) carried out under the auspices of WHO.

25. The Committee's decision to produce a review of the available information 12 to 14 years after the Chernobyl accident, for publication in a scientific report in the year 2000, is fully supported.

26. In the light of the above-mentioned points, WHO agrees with the recommendation of the report, namely, that on the basis of this summary of the Committee's past and present programmes, the Committee recommends that the General Assembly maintain the present functions and role of the Committee, including the present reporting arrangements. This is in agreement with WHO Executive Board resolution (EB 102.R2) which recommends that the present functions and independent scientific role of the Committee, including the present reporting arrangements, should be maintained.

27. The above-mentioned justifies an overall positive assessment of the Committee's annual report.